भारतीय मानक
Indian Standard

IS 16440 : 2016
(Reaffirmed 2021)

स्टेनलैस स्टील के दूध के डिब्बे — विशिष्टि

Stainless Steel Milk Cans — Specification

ICS 55.120; 67.100.01; 77.140.20

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July 2016 **Pr ice Group 3**

Dairy Products and Equipment Sectional Committee, FAD 19

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Dairy Products and Equipment Sectional Committee had been approved by the Food and Agriculture Division Council.

An ideal milk can has to be designed in such a way that it shall transport its contents safely without spillage and with minimum of churning. It shall also withstand rough handling, occupy minimum space on trucks or lorries, allow a high degree of sterilization and shall also facilitate cleaning. Further, it has to be light and durable. In India, at present, milk cans in use are made of aluminium alloy and stainless steel. The requirements for aluminium alloy milk cans are covered in IS 1825 : 1983 'Specification for aluminium alloy milk cans'. This standard has been formulated to cover the requirements of stainless steel milk cans.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding-off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

STAINLESS STEEL MILK CANS — SPECIFICATION

1 SCOPE

This standard prescribes the requirement for stainless steel milk cans used for collection and distribution of liquid milk. This standard covers cans of 5, 10, 20, 30, 40 and 50 litre capacities.

2 REFERENCES

The following standards contain provision which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1500 (Part 1) : 2013 /ISO 6506-1 : 2005	Metallic materials — Brinell hardness test: Part 1 Test method (*fourth revision*)
3073 : 1967	Assessment of surface roughness
3658 : 1999	Code of practice for liquid penetrant flaw detection (*second revision*)
4905 : 1968	Methods for random sampling
5522 : 1992	Stainless steel sheets and strips for utensils — Specification (*second revision*)

3 CAPACITY

The rated capacity of the can shall be taken as the quantity of water measured, in litre, which fills the can to the junction of the shoulder and the neck. This quantity shall be within a tolerance of ±2 percent of the rated capacity.

4 SHAPE AND DIMENSIONS

The cans shall be manufactured in accordance with the shape and dimensions as given in Table 1 read with Fig. 1 to Fig. 4.

5 MANUFACTURE

5.1 The cans of 5, 10 litre capacity shall be fabricated from the sheet or coil of stainless steel having thickness of 0.8 ± 0.05 mm and 1.0 ± 0.05 mm, respectively conforming to ISS 304 grade of IS 5522. The handle shall be made from round bar of stainless steel of diameter 5 mm conforming to ISS 304 grade of IS 5522.

5.2 The cans of 20, 30, 40 and 50 litre capacity shall be fabricated from the sheet or coil of stainless steel having thickness of 1.2 ± 0.05 mm conforming to ISS 304 grade of IS 5522. The handle shall be made from round bar of stainless steel of diameter 12 mm and the bottom ring shall be made from sheet or coil of stainless steel having thickness of 2 mm conforming to ISS 304 grade of IS 5522.

5.3 Parts

Cans of 5 and 10 litre capacity shall consist of a body (without bottom ring), lid and handle attached to neck with ears. The cans of 20, 30, 40 and 50 litre capacities shall consist of a body, bottom ring, lid and handles.

5.4 The minimum thickness for different parts of finished cans shall be as given in Table 2.

5.5 The mass of the 5, 10, 20, 30, 40 and 50 litre can including the lid shall be as per Table 3.

Table 1 Specifications for Different Capacity Milk Cans

(*Clause* 4.1)

Sl No. (1)	**Capacity** litre (2)	**A (Total Height)** mm (3)	**B (Internal Height)** mm (4)	**CΦ (Internal Diameter)** mm (5)	**DΦ (Neck Diameter)** mm (6)	**EΦ (Base Diameter)** mm (7)
i)	5	250 ± 3	NA	176 ± 3	130 ± 1	NA
ii)	10	285 ± 3	NA	234 ± 3	173 ± 1	NA
iii)	20	435 ± 4	411 ± 4	280 ± 3	200 ± 0.5	286 ± 3
iv)	30	481 ± 4	457 ± 4	340 ± 3	200 ± 0.5	346 ± 3
v)	40	591 ± 4	567 ± 4	340 ± 3	200 ± 0.5	346 ± 3
vi)	50	700 ± 4	676 ± 4	340 ± 3	200 ± 0.5	346 ± 3

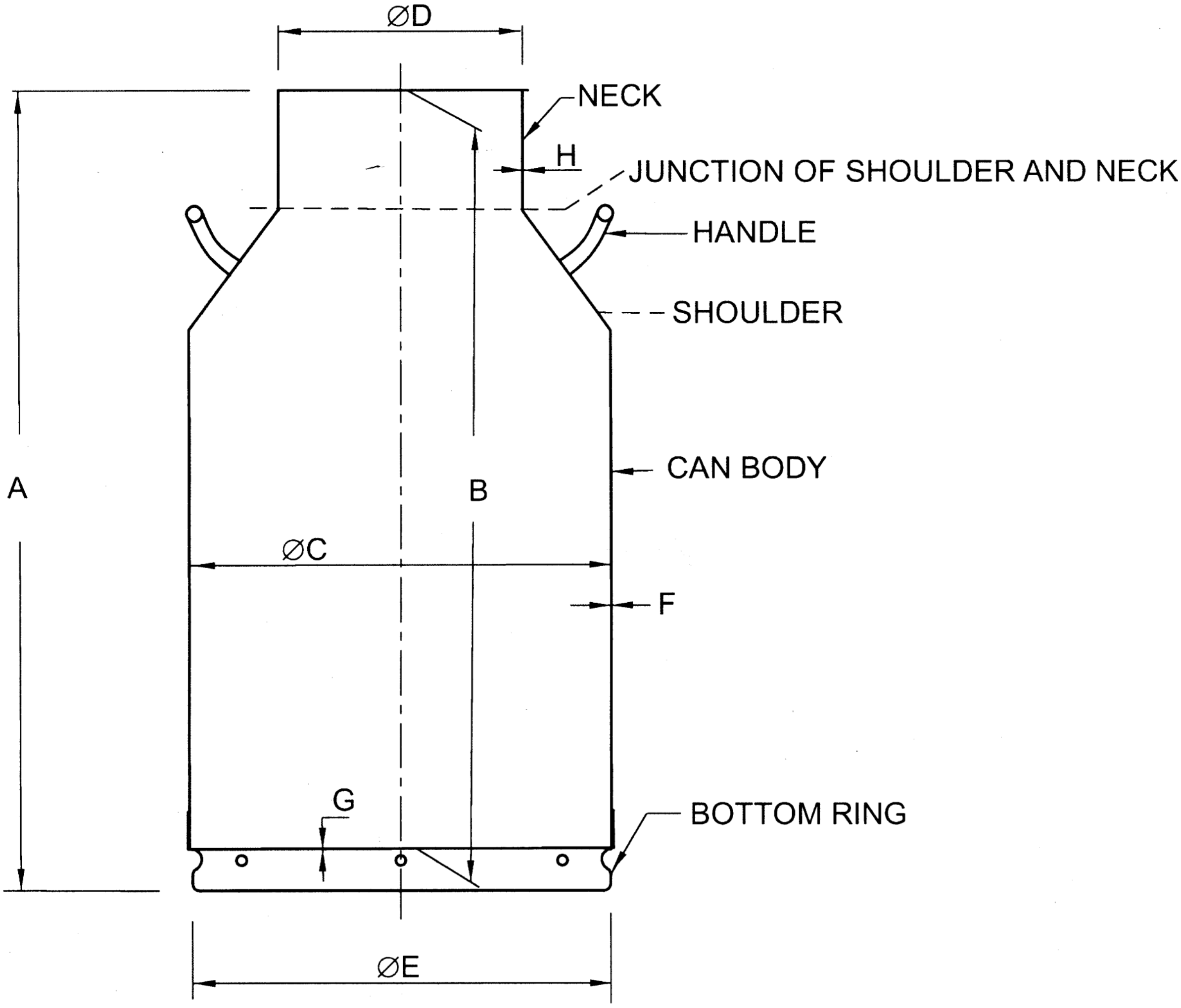


FIG 1 TYPICAL STAINLESS STEEL MILK CAN – TRANSPORT TYPE (20, 30, 40 AND 50 LITRE)

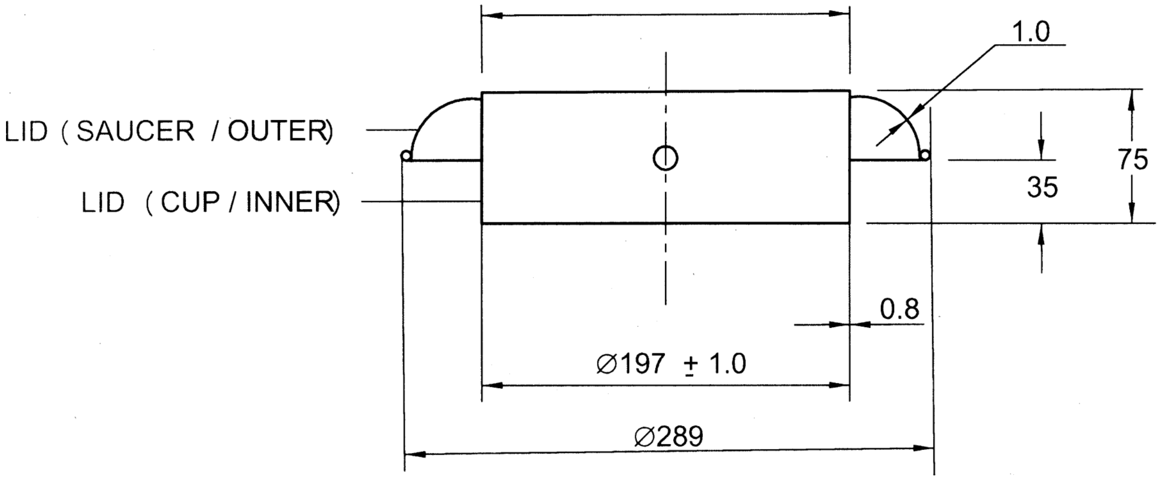


FIG 2 LID FOR STAINLESS STEEL MILK CAN — TRANSPORT TYPE (20, 30, 40 AND 50 LITRE)

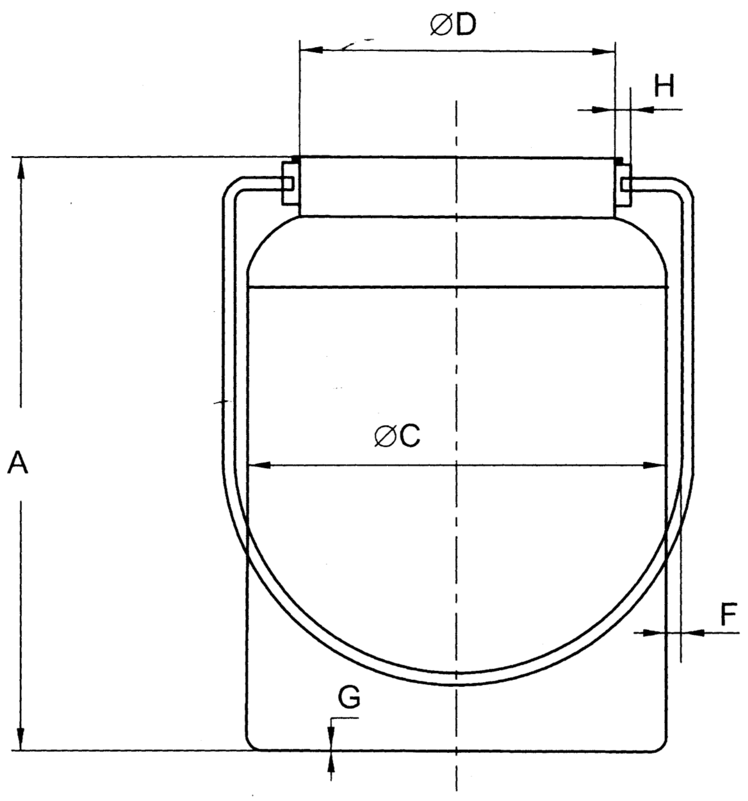
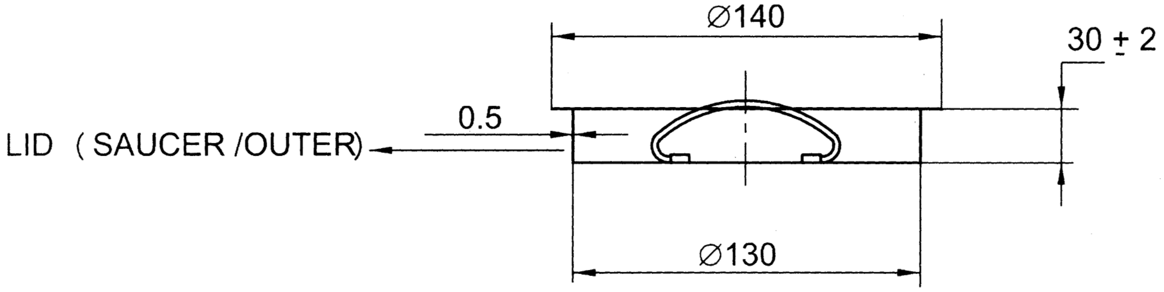
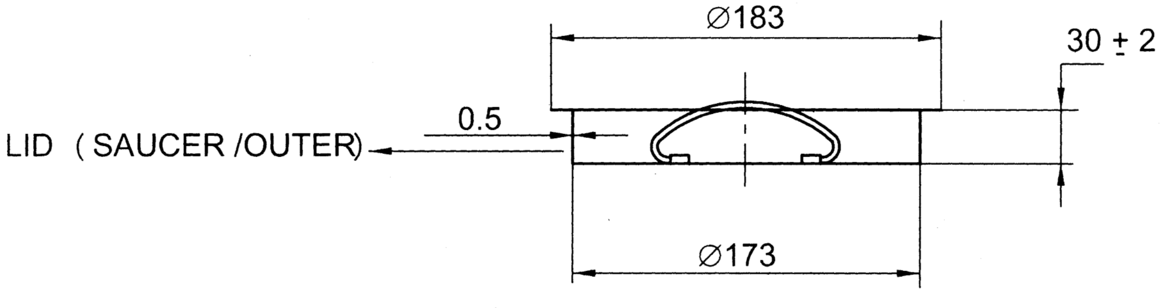


FIG 3 TYPICAL STAINLESS STEEL MILK CAN — 5 AND 10 LITRE



LID FOR 5 LITRE STAINLESS STEEL MILK CANS



LID FOR 10 LITRE STAINLESS STEEL MILK CANS

FIG 4. LID FOR STAINLESS STEEL MILK CAN — 5 AND 10 LITRE

Table 2 Minimum Thickness for Different Parts of the Cans (in millimetre)

(*Clause* 5.4)

Sl No.	Part	Capacity					
		5 litre	10 litre	20 litre	30 litre	40 litre	50 litre
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Body	0.5	0.6	1.0	1.0	1.0	1.0
ii)	Bottom	0.6	0.8	1.1	1.1	1.1	1.1
iii)	Neck	0.4	0.4	0.95	0.95	0.95	0.95
iv)	Lid (Cup/Inner)	NA	NA	0.8	0.8	0.8	0.8
v)	Lid (Saucer/Outer)	0.5	0.5	1.0	1.0	1.0	1.0

Table 3 Minimum Weight for Different Parts of the Cans (in kg)

(*Clause* 5.5)

Sl No.	Part	Capacity					
		5 litre	10 litre	20 litre	30 litre	40 litre	50 litre
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Can	0.650	1.150	4.000	6.200	7.200	8.200
ii)	Lid	0.100	0.250	1.200	1.200	1.200	1.200
iii)	Total	0.750	1.400	5.200	7.400	8.400	9.400

5.6 Construction

5.6.1 *Body*

Five and ten litre cans shall be formed in a single piece construction as given in Fig. 3. The 20, 30, 40 and 50 litre cans body shall be fabricated in two pieces as given in Fig. 1. The bottom and top halves shall be deep drawn and spinned. The top and bottom pieces shall be welded circumferentially. All welding shall be done with argon arc process (TIG) and ground smooth. Top edge of the neck shall be folded.

5.6.2 *Handle*

Five and ten litre can shall have flexible handle, attached with ears to the can body. The ears shall be spot welded at the neck of the can. 20, 30, 40 and 50 litre can handle shall be designed to give good grip of the can, welded on the taper neck with 2 number pad plate for each handle, adequately thick to avoid any protrusion inside the can.

5.6.3 *Bottom Ring*

The bottom ring shall be shrink-fitted with proper locking arrangement on the body. The bottom ring shall permit draining of water and detergent from bottom of the reversed can and there shall not be any cavity on the ring, which could lead to unhygienic conditions.

5.6.4 *Lid*

The lid of 5 and 10 litre capacity can shall be one piece shallow drawn and shall have a collapsible handle of 5 mm diameter with ears spot welded on the lid as given in Fig. 4. For 20, 30, 40 and 50 litre can the conical skirt shall be provided with 3 number air equalizing holes. The lid shall have mushroom shape to drain off any water outside. The lid shall be provided with 2 number punched holes on the mushroom canopy near periphery of lid for locking/sealing the can. The cup and saucer portions of the lid shall be welded to each other circumferentially, preferably by fusion welding process and shall be braised all around on the inside of the lid. In case fusion welding is not done, it shall be done by employing TIG process. There shall not be any deformation or unevenness and it shall be ground smooth. The shape of the lid shall be as given in Fig. 2.

5.6.5 *Welding*

The can shall be welded by TIG or MIG process with argon as inert gas medium and only, AWS ER 308 L filler wire shall be used.

5.6.6 *Finish*

On visual examination there shall be no cracks, notching or porous patches in the welded surfaces and the surface adjacent to the weld. The weld surface shall be regular and even. All welded joints, inside surface and outside surface shall be finished smooth to minimum 220 grit or maximum Ra value 0.48 µm to provide a sanitary finish. The can surface including the taper neck portion should be wrinkle free. There should not be any sharp corner. All such corners shall have a minimum radius of curvature of 25 mm.

5.6.7 *Heat Treatment and Passivation*

The can shall be heat treated to relieve the stress developed during deep drawing and spinning. Thereafter complete surface shall be passivated with standard passivation solution to enhance corrosion resistance to base material and welded surfaces.

6 TESTS

6.1 Pressure Check for Leakage/Bulging

The 20, 30, 40 and 50 litre cans (not applicable for 5 and 10 litre capacity can) when immersed in water and subjected to internal air pressure of 70 kPa for 5 min shall show no signs of leakage or any other damage during or after the test.

6.2 Drop Test at Rated Capacity

The 20, 30, 40 and 50 litre cans (not applicable for 5 and 10 litre capacity can) filled to rated capacity with water and with lid on shall be held in a vertical position and dropped once vertically from a height of 125 cm on a horizontal hard concrete floor or steel surface. The cans shall neither show any leakage nor suffer from any damage other then denting. The bottom ring shall neither partially nor fully detach from the body of the can.

6.3 Hardness Test

The 20, 30, 40 and 50 litre cans shall have minimum hardness (Brinell hardness) of 200BH for body and 150BH for bottom when tested as per IS 1500. Five and 10 litre capacity can shall have minimum hardness of 150BH when tested as per IS 1500 (Part 1).

6.4 Dye Penetration Test

Dye penetration test (*see* IS 3658) of all weld joints (not applicable for 5 and 10 litre capacity can) shall be carried out to ensure that there are no defects in welding. The test surface shall be cleaned to remove any dirt, paint, oil, grease or any loose scale that could either keep penetrant out of a defect, or cause irrelevant or false indications. The red dye penetrant shall then be applied to the surface of the item being tested. The penetrant is allowed dwell time of 20 min to soak into any flaws. The excess penetrant is then removed from the surface by solvent remover. After excess penetrant has been removed a white developer is applied to the sample. Inspection of the test surface shall take place after 10 to 30 min of development time. The developer draws out the penetrant from defects onto the surface to form a visible indication, commonly known as bleed-out. Any area that bleeds out indicates the location, orientation and possible types of defects on the surface.

6.5 The 20, 30, 40 and 50 litre cans (not applicable for 5 and 10 litre capacity can) when filled with water and inverted shall not show any profuse leakage through lids.

7 MARKING

7.1 Each can shall be marked legibly and permanently with at least following particulars:

a) Manufacturer's name or initial or trade-mark, if any;
b) Rated capacity of the can, in litre;
c) Batch or code number and year of manufacture;
d) Buyer's logo or identification mark (optional);
e) Material of construction 304 grade;
f) Capacity mark on inside surface of the can; and
g) Any other markings which may be required by the purchaser and agreed upon between the supplier and the purchaser.

7.2 BIS Certification Marking

The product may also be marked with Standard Mark.

7.2.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8 SAMPLING AND CRITERIA FOR CONFORMITY

The method of drawing representative samples of the cans and the criteria for conformity shall be as prescribed in Annex A.

ANNEX A

(*Clause* 8)

SAMPLING OF STAINLESS STEEL MILK CANS

A-1 SCALE OF SAMPLING

A-1.1 Lot

In any consignment, all the cans of the same size, shape and from the same batch of manufacture shall be grouped together to form a lot.

A-1.2 Samples shall be tested separately for each lot for ascertaining the conformity of cans to the requirements of this specification.

A-1.3 The number of cans to be selected from the lot shall depend on the size of the lot and shall be in accordance with col 2 and col 3 of Table 4.

A-1.3.1 These cans shall be selected at random from the lot. To ensure the randomness of selection, a random number table (*see* IS 4905) as agreed to between the purchaser and the supplier shall be used. In case such a table is not available, the following procedure shall be used:

Starting from any can in the lot, count them as 1, 2, 3,……., up to *r* and so on in one order, where *r* is the integral part on *N/n*, *N* being the number of cans in the lot and *n* the number of cans to be selected (*see* Table 4), every *r*th can thus counted shall be withdrawn to give the required number of cans in the sample.

A-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

A-2.1 All the cans selected according to col 3 of Table 4 shall be first examined for visual and dimensional requirements given in **4.1**, **5.5**, **5.6.1**, **5.6.2**, **5.6.3** and **5.6.4** and then tested for air pressure according to **6.1**.

A-2.1.1 A can failing to satisfy any of these requirements shall be considered as defective. The lot shall be considered to have satisfied these requirements, if the number of defectives found in the sample is less than or equal to the corresponding permissible number of defective cans given in col 4 of Table 4.

A-2.2 The lot having been found satisfactory according to **A-2.1** shall be tested for thickness (*see* **5.4**) and for tests given in **5.6.6**, **6.2**, **6.3**, **6.4** and **6.5**. For each of these tests, a subsample of cans shall be selected according to col 5 of Table 4. These cans shall be selected from those already tested according to **A-2.1** and found satisfactory.

A-2.2.1 The lot shall be declared as conforming to the requirements of the specification, if none of the cans tested for requirements given in **5.4**, **5.6.6**, **6.2**, **6.3**, **6.4** and **6.5** fails to meet the corresponding specification requirements; otherwise not.

Table 4 Scale of Sampling and Permissible Number of Defectives

(*Clause* A-1.3)

Sl No.	**Number of Cans in the Lot**	**For Visual, Dimensional Requirement and Air Pressure Test**		**For Thickness and Other Tests**
	(N)	Number of Cans to be Selected (*n*)	Permissible No. of Defective Cans	Number of Cans to Be Selected (*n*)
(1)	(2)	(3)	(4)	(5)
i)	3 to 25	3	0	1
ii)	26 - 100	5	0	1
iii)	101 - 300	8	0	2
iv)	301 - 500	13	1	2
v)	501 - 1 000	20	1	3
vi)	1 001 - 3 000	32	2	3
vii)	3 001 and above	50	3	5

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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AMENDMENT NO. 1 APRIL 2021

TO

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[*Page* 1, *Table* 1, *Sl No.* (iv), *col* 5] — Substitute ‘342 ± 3’ for ‘340 ± 3’.

[*Page* 1, *Table* 1, *Sl No.* (v), *col* 5] — Substitute ‘342 ± 3’ for ‘340 ± 3’.

[*Page* 1, *Table* 1, *Sl No.* (vi), *col* 5] — Substitute ‘342±3’ for ‘340±3’.

[*Page* 1, *Table* 1, *Sl No.* (iv), *col* 7] — Substitute ‘348 ± 3’ for ‘346 ± 3’.

[*Page* 1, *Table* 1, *Sl No.* (v), *col* 7] — Substitute ‘348 ± 3’ for ‘346 ± 3’.

[*Page* 1, *Table* 1, *Sl No.* (vi), *col* 7] — Substitute ‘348 ± 3’ for ‘346 ± 3’.

(FAD 19)

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